

MAINTENANCE OF SUPPLIES AND EQUIPMENT

MEMPHIS DISTRICT MATERIEL MAINTENANCE PLAN

DP 750-1-1
19 Nov 99

Memphis District MATERIEL MAINTENANCE PLAN

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CEMVN-LO

DEPARTMENT OF THE ARMY
Memphis District, Corps of Engineers
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Memphis, Tennessee 38103-1894

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Maintenance of Supplies and Equipment
MEMPHIS DISTRICT MATERIEL MAINTENANCE PLAN

1. PURPOSE. This plan establishes policies and procedures, assigns responsibilities, provides guidance and defines requirements for routine maintenance inspections and services of all personal property within the Memphis District.

2. APPLICABILITY. This plan is applicable to all organizational elements/activities and personal property (both project and revolving funded) of the Memphis District. Personal property includes engineering or special purpose equipment, commercial design vehicles, watercraft, amphibians, communications systems, automated data processing equipment and communications security equipment that is self-propelled, towed, or stationary self-powered with an acquisition value (single item or system total) of \$5000.00 or more. The term personal property does not apply to real property, equipment specifically used for research and development, test and evaluation, or vessels over 1500 gross tons (dredges).

3. REFERENCES.

- a. ER 750-1-1, Materiel Maintenance Policies
- b. EP 750-1-1, Procedural Pamphlet for Materiel Maintenance Policies
- c. AR 750-1, Army Materiel Maintenance Policy and Retail Maintenance Operations
- d. DA PAM 738-750, Functional Users Manual for the Army Maintenance Management System (TAMMS)
- e. AR 750-43, Test, Measurement, and Diagnostic Equipment (TMDE)
- f. EM 385-1-1, Safety and Health Requirements Manual

4. RESPONSIBILITIES.

a. The Commander will appoint, in writing, the District Maintenance Officer (DMO). The DMO will advise and assist Maintenance Managers and Coordinators, maintain and ensure the completeness and accuracy of this plan, and ensure the submission of organizational elements maintenance plans and consolidated equipment listings. Additionally, the DMO will:

- (1) Monitor the Materiel Maintenance Program for the District.
- (2) Advise the Chief, Logistics Management Office (CEMVM-LO), of changes necessary to improve the District Materiel Maintenance Program.
- (3) Ensure compliance with materiel maintenance standards in accordance with governing directives, policies and procedures.

(4) Assist in developing local policies and procedures. Also assist supervisors, maintenance personnel and equipment operators in implementing the materiel maintenance directives, standards and guidelines.

(5) Visit all organizational elements (including area offices, boats, and remote field units, etc.) to evaluate the Materiel Maintenance Program. These visits will assist in ensuring the enforcement and application of policies and procedures according to applicable materiel maintenance directives, standards and guidelines.

(6) Prepare and complete annual evaluations and reviews of the Materiel Maintenance Program within the District and submit a copy of each report to CEMVM-LO.

(7) Serve as the point of contact for the District Materiel Maintenance Program.

b. Division/Office Chiefs will:

(1) Establish procedures for the maintenance of all personal property within their areas of responsibility, publish appropriate maintenance plans and compile appropriate equipment listings.

(2) Appoint, in writing, Maintenance Managers and Coordinators, Test, Measurement, and Diagnostic Equipment (TMDE) coordinators and Oil Analysis Program (OAP) coordinators.

(3) Ensure copies of maintenance plans, equipment listings, and all appointment orders, to include all changes, are forwarded to the DMO in a timely manner.

c. CEMVM-LO will:

(1) Implement HQUSACE guidance and standards to improve the Materiel Maintenance Program of the Memphis District.

(2) Ensure compliance with materiel maintenance standards and related logistical performance standards.

(3) Develop and establish local policies and procedures as necessary to implement the Materiel Maintenance Program.

(4) Assist Division/Office Chiefs in executing the District Maintenance Plan.

d. Maintenance Managers will:

(1) Manage and supervise all maintenance functions within their assigned areas.

(2) Develop and review, on an annual basis, maintenance plans. A copy will be sent to the DMO for inclusion in the District Maintenance plan.

(3) Ensure scheduled and unscheduled maintenance is conducted expeditiously and by the most economical and practical means.

(4) Ensure the implementation of this plan within respective organizational elements.

(5) Ensure maintenance coordinators accomplish the responsibilities and duties prescribed by this plan.

(6) Receive and forward all required reports

e. Maintenance Coordinators will:

(1) Ensure the performance of maintenance on equipment listed in the consolidated equipment listing.

(2) Perform dispatching procedures on all equipment as outlined in references a and b.

(3) Develop and furnish Equipment Maintenance Checks & Services (EMCS) schedules to operators and users.

(4) Receive completed Equipment Inspection/Maintenance Worksheet from operators/users and determine if the equipment is operational and safe to use.

(5) Ensure the performance of scheduled and unscheduled maintenance.

(6) Ensure maintenance data is maintained, recorded, and transferred to appropriate equipment records.

(7) Complete and forward, through the organizational Maintenance Manager, to the DMO, all required reports (See Appendixes).

(8) Track and comply with equipment warranty requirements.

(9) Maintain operator records.

(10) Schedule maintenance actions and establish priorities when work schedules conflict.

(11) Prepare and maintain an updated equipment listing and furnish a copy to CEMVM-LO-S, Attn: DMO, through the designated Maintenance Manager, whenever changes occur.

(12) Prepare and maintain updated EMCS checklists for each type of equipment. The EMCS checklist will be submitted through the Maintenance Manager to the DMO. The EMCS will include daily, safety, and periodic checks to ensure equipment is serviceable in accordance with the service manual and the Corps of Engineers maintenance and safety requirements. The Maintenance Coordinator is responsible for ensuring the performance of all repairs.

(13) Ensure all equipment is properly dispatched in accordance with references a and b.

(14) Manage, maintain and secure the maintenance files, equipment logbooks, Preventive Maintenance Schedule and Records, and Equipment Repair and Cost Record in accordance with reference b. An Automated Maintenance Management System may be used to accomplish the above, as long as all data is recorded.

g. Operators/users will:

(1) Perform EMCS on Equipment. Complete Equipment Inspection/Maintenance Worksheet in accordance with reference b. If equipment faults are found that the operator can not correct, report them immediately to the Maintenance Coordinator.

(2) Forward EMCS results and other records to the Maintenance Coordinator.

(3) Ensure the equipment is properly dispatched and authorized for use by the Maintenance Coordinator.

(4) Complete the equipment utilization record located in the equipment record book each time the equipment is used.

5. GENERAL PROGRAM OBJECTIVES:

a. To achieve maximum efficiency in the operation and use of personal property throughout its life cycle.

b. Ensure the use and maintenance of personal property is in compliance with this plan and the procedures as outlined in references a and b.

c. Ensure maintenance personnel and equipment operators/users are familiar with and adhere to the procedures as outlined in this plan.

d. Ensure maintenance of personal property is sustained at the highest level practical to enable positive response to all mission requirements.

e. Ensure early detection of equipment faults by operators/users performing EMCS which will assist in ensuring timely repairs.

6. MAINTENANCE CONTROL FORMS. The standard forms and logbook formats to be used throughout the District are outlined in references a and b, and in maintenance software systems, i.e., Vehicle Information Management System (VIMS) and DynaStar 2000. Existing manual or automated maintenance management programs may be used to substitute for or replace any method outlined in this plan, as long as all pertinent data is captured. If the methods used at the site varies from the above, it must be outlined in the maintenance plan/sub-plan for that activity and sent to the DMO.

7. INSPECTION.

a. The DMO will conduct a detailed annual review of District maintenance system procedures and will prepare, in writing, an evaluation of each organizational element maintenance program. The written annual evaluation will be forwarded, through the appropriate Division/Office Chiefs, to the Commander for review. The evaluation will be maintained by the DMO for a period of 2 years.

b. Maintenance Managers will conduct periodic inspections to ensure that maintenance system procedures are in place.

c. Supervisors will make informal spot checks to ensure the performance of maintenance and corrective action is taken.

8. WARRANTY CONTROL OFFICER (WCO). The DMO is designated as the WCO for the District. The Maintenance Coordinator will track and report all warranty problems to the WCO. The WCO will:

- a. Act as the point of contact for all actions connected with various equipment warranties. Workmanship or performance under warranties are not under the cognizance of the WCO, but are governed by the terms of the contract and the practices and procedures established by the Contracting Officer.
- b. Ensure maintenance repairs are covered by the applicable warranty.
- c. Ensure maintenance records are properly documented to record the warranty action and ensure warranty claim actions are submitted accurately and timely.
- d. Act as liaison, conduct visits, inspections and coordinates with all using organizational elements and contractors or vendors to ensure work is completed properly and in a timely manner, according to the terms of the warranty.
- e. Ensure appropriate Maintenance Managers and Coordinators receive feedback from contractors/vendors concerning maintenance time and parts used to repair equipment under warranty.
- f. Monitor and collect data on equipment repair and services performed under warranty.
- g. Maintain materiel maintenance warranty historical records and reports.

9. OIL ANALYSIS PROGRAM (OAP). OAP is a diagnostic procedure, which analyzes used oil from equipment. This procedure provides early predictions of component (engine, transmission and hydraulic) failure or wearout.

- a. Participation in OAP is mandatory as prescribed by references a and c. Guidelines and procedures for the OAP are outlined in Chapter 4, reference d, and Appendix I of this plan.
- b. The DMO will act as the OAP Manager for the District. The DMO will provide guidance and coordinate packaging and shipping of oil samples to the appropriate laboratory.
- c. Maintenance Coordinators will ensure all oil samples and shipping preparations are completed at the prescribed intervals listed in reference d and Appendix E of reference b.
- d. Only the equipment/components listed in the above references will be sampled. Requests for other samples or use of Commercial Labs will be submitted, in writing, to the DMO (CEMVM-LO-S) with justification.
- e. A commercial Oil Analysis Lab may be used as long as there is no cost to government. Some oil distributors furnish these services free if you use their oil in your equipment. If this is the case, furnish the name and address of the Oil Lab and a copy of the test results to CEMVM-LO-S, Attn: DMO.

10. TEST, MEASUREMENT AND DIAGNOSTIC EQUIPMENT (TMDE). The DMO is designated as the TMDE Program Manager.

a. The TMDE program (calibration) is necessary to ensure the accuracy of equipment and tools. The procedures in reference e. will be followed. Requests for exceptions will be sent through the appropriate TMDE Coordinator to the TMDE Program Manager with written justification.

b. Maintenance Managers and Maintenance Coordinators will ensure that all TMDE equipment and tools are enrolled in the program.

c. TMDE coordinators will provide assistance in the administration of the TMDE Program.

d. Equipment requiring calibration will be submitted to the Regional Army TMDE Laboratory (See Appendix J for procedures). This submission will be in accordance with the calibration recall schedule on or before the calibration void date shown on the equipment label. TMDE that is too heavy, bulky or sensitive to transport will be serviced on site as agreed between the government and the supporting laboratory or commercial contractor.

11. QUALITY ASSURANCE/QUALITY CONTROL (QA/QC). Maintenance Managers will develop a QA/QC program to ensure the performance of quality maintenance.

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DANIEL W. KRUEGER

Colonel, Corps of Engineers

Commanding

DISTRIBUTION:

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APPENDIX A

OPERATOR RESPONSIBILITIES

1. PURPOSE. To outline operator maintenance responsibilities, training, and certification requirements. This appendix addresses maintenance issues related to the equipment operator.

2. GENERAL. The operator is the most critical component of an effective equipment maintenance program. It is essential operators be aware of their responsibilities and their importance in the program. This appendix emphasizes, to all personnel, the important role the operator has in the accomplishment of this plan and the need for the operator to be trained in equipment operation and maintenance.

a. Each Maintenance Coordinator is responsible for ensuring the equipment operator is trained and has the necessary State, Federal, Local Government and Agency licenses or certifications. Maintenance Coordinators must also ensure operators are competent to safely operate the equipment.

b. The operator of trucks or truck/trailer combinations with a gross vehicular weight (GVW) of 26,000 pounds or greater, vehicles carrying hazardous materials, vehicles or buses carrying more than 15 passengers or other vehicles or equipment requiring a State Commercial Driving License (CDL), must have a valid State CDL prior to operation of the vehicle/equipment. Obtaining the CDL is at the expense of the operator.

c. Crane operators must be certified in accordance with EM 385-1-1.

d. Equipment/vehicle operator must be competent in the safe and efficient use of the equipment or receive additional training.

e. Vehicle/equipment operators will perform the daily and periodic EMCS and complete all required maintenance forms in accordance with reference b.

f. Vehicle/equipment operators will report any unusual noises, performance malfunctions and other faults to the Maintenance Coordinator.

3. MOTOR VEHICLES/EQUIPMENT INSPECTIONS.

a. All Maintenance Coordinators/Managers or Supervisors have the responsibility to ensure all assigned unit's motor vehicles or equipment are in a safe condition and operational, prior to dispatching on a daily or weekly basis.

b. The Vehicle/Equipment Operator (Driver) is responsible for conducting a vehicle inspection before, during and after operating the vehicle/equipment.

c. Method of conducting Vehicle/Equipment Inspections. Prior to operating the vehicle/equipment (daily):

(1) Before Operation Checks:

(a) Walk-around the vehicle/equipment, inspect for damage (dents, scratches, etc.), pilferage and tire conditions, including the spare tire.

lights.

- (b) Check condition and the operation of the horn, wipers, mirrors, windows and all

- (c) Check instrument panel warning lights and gauges.

- (d) Check the emergency equipment, brake-release/engage controls and brake pedal for proper operation.

- (e) Check for leaks (under the vehicle/equipment).

- (f) Check vehicle/equipment for cleanliness.

- (g) Check safety belt(s) for proper operation.

(2) During operation of the vehicle/equipment:

- (a) Check for unusual noises or operating irregularities (i.e., brakes, pulling, steering problems, transmission and engine noises, etc.).

- (b) Check lights, turn signals and instrument panel for proper operation.

(3) After operation of the vehicle/equipment:

- (a) Check exterior for damages.

- (b) Check under the vehicle/equipment for leaks.

- (c) Check lights, tires, horn, windows and mirrors.

- (d) Check the interior of the vehicle/equipment for damages.

- (e) Check the fuel level. Refuel the vehicle/equipment, as needed. Should be at least $\frac{1}{2}$ full.

d. Weekly Inspections: If the vehicle/equipment remains idle during the normal workweek, the designated Maintenance Coordinators will ensure that a weekly vehicle/equipment inspection is properly conducted.

4. DRIVER (Vehicle/Equipment Operator's) RESPONSIBILITIES:

- a. Conducting a vehicle/equipment inspection before, during, and after operating the Government vehicle/equipment.

- b. Reporting vehicle/equipment malfunctions and discrepancies to the Vehicle/Equipment Dispatcher immediately.

- c. Safely operating the vehicle/equipment and complying with applicable federal, state and local laws and regulations.

- d. Following all operator maintenance requirements.

times. (1) Caring for and cleaning the vehicle/equipment and its accessories/components at all

are fastened) (2) Ensuring the safety and comfort of fellow passenger(s) (ensure seat and shoulder belts

(3) Ensuring the security of the vehicle/equipment entrusted to you.

(4) Reporting damages, incidents or accidents during the period of the vehicle/equipment's operation to supervisor and Vehicle/Equipment Dispatchers.

NOTE: The life expectancy and capability of the vehicle/equipment you are assigned to operate, depends on you. Remember, you are subject to corrective action by the Commander for incidents that involves negligent abuse, misuse and damage to the vehicle/equipment assigned to you.

APPENDIX B

GENERAL EQUIPMENT CHECKLISTS

The checklists below provide the minimum Equipment Maintenance Checks and Services (EMCS is the care, servicing, inspection, detection and correction of minor faults before these faults cause serious damage, failure, or injury) to be performed on each type of equipment in the absence of other guidance. Operators, Maintenance Managers, Maintenance Coordinators, and Supervisors have the responsibility to ensure equipment is in a safe and operational condition before and during operation. All discovered faults will be noted on Equipment Inspection/Maintenance Worksheet and reported to the Maintenance Coordinator for action.

EQUIPMENT MAINTENANCE CHECKS AND SERVICES (EMCS) AUTOMOBILE AND TRUCK (MAX. 2 1/2 TON)

DAILY

NOTE: If this is the first time you have operated this vehicle or you have not operated this vehicle in over a week, do the weekly checks as well as the daily.

1. Walk-around inspection for damage, pilferage and tire conditions.
2. Check instrument panel warning lights and gauges.
3. Check for unusual noises or operating irregularities (i. e., brakes pulling, steering problems, engine noises, rough riding, etc.)
4. Check condition of seat belts.
5. Check for leaks.
6. Check vehicle for cleanliness.

WEEKLY (in addition to the daily)

1. Tires: check air pressure, wear pattern and check for cuts or defects. This includes the spare tire.
2. Check safety equipment (fire extinguisher, first aid kit, etc.).
3. Check all lights.
4. Check all drive belts and hoses.
5. Check all fluid levels.
6. Check when the next scheduled service is due.

BOATS/OUTBOARD MOTORS/TRAILERS

BOATS:

1. Check equipment (mooring ropes, anchors, poles or paddles, batteries, wiring, etc.).
2. Check hull.
3. Check bilge ventilation and leakage.
4. Check steering controls.
5. Check navigation equipment (i.e., lights, horn, etc.).
6. Check windshield/operator compartment.
7. Check safety equipment (i.e., fire extinguisher, first aid kit, life preservers, etc.).
8. Check cleanliness.
9. Check seat or console covers.
10. Check for any visual damage.
11. Perform radio check.
12. Check overall security after usage.

OUTBOARD MOTORS:

1. Check fuel supply and lines.
2. Check battery condition.
3. Check oil level.
4. Check propeller condition.
5. Check engine/lower unit.
6. Check cleanliness.
7. Check for unusual noises, etc.

TRAILERS:

1. Check tire pressure (do not exceed pressure rating on tire).
2. Check electrical system (all lights, wiring, etc.).

3. Check for damaged or missing parts or tiedowns.

ELECTRIC ARC, WELDER

PRE-OPERATIONAL EMCS:

1. Check for visual damage.
2. Check for loose and/or frayed connections.
3. Check for cleanliness.
4. Check fire extinguisher condition.
5. Check personal protective apparel and safety equipment.
6. Check for other operating problems (i.e., fan operation, erratic weld current, etc.).

MONTHLY EMCS:

1. Perform pre-operational EMCS.
2. Run unit for 1/2 hour.
3. Make a short functional test by welding a steel plate.

PORTABLE LINCOLN WELDER

PRE-OPERATIONAL EMCS:

1. Check fuel supply.
2. Check oil level.
3. Check battery condition.
4. Check for visual damage/leaks.
5. Check for cleanliness.
6. Check tire pressure.
7. Listen for any unusual noises, loss of power, etc.
8. Check personal protective equipment.

MONTHLY EMCS:

1. Perform pre-operational EMCS.

2. Run unit for one hour (charges battery, dries out possible moisture, and helps keep seals lubricated).

WATER PUMP (EIGHT INCH)

PRE-OPERATIONAL EMCS:

1. Check for damage, leaks, loose belts, broken lines, etc.
2. Check tire pressure.
3. Check electrical system connections, running, brake, signal lights, etc.
4. Check engine oil.
5. Check coolant.
6. Check fuel level.
7. Check governor oil level.
8. Check flap valve for free movement

WATER PUMP (2.5")

PRE-OPERATIONAL EMCS:

1. Check for damage or leaks.
2. Check engine oil.
3. Check fuel level.
4. Inspect all inlet and outlet hoses for wear, cracks, etc.
5. While operating the pump, listen for unusual noises and for smooth operation.

PORTABLE GENERATOR

1. Check for damage and leaks.
2. Check engine oil.
3. Check fuel level.
4. Check power receptacle and test Ground Fault Circuit Interrupter (GFI) protection.
5. Listen for unusual noise/smooth operation.

6. Check for cleanliness.

FORKLIFT TRUCK

1. Check for damage, loose belts, broken hinges, etc.
2. Check for leaks.
3. Check tire pressure.
4. Check electrical system.
5. Check engine/transmission oil levels.
6. Check hydraulic oil level.
7. Check power steering oil level.
8. Check seat belt condition.
9. Check parking brake.
10. Check reverse alarm signal.

CRAWLER TRACTORS, DOZERS, SCRAPERS, MOTOR GRADERS, BACKHOES, HEAVY HAULER UNITS

GENERAL EMCS:

1. Conduct visual inspection for damage, pilferage and equipment condition.
2. Check rollover protection, moving parts, operator's shields, guards and covers.
3. Check lights and slow moving vehicle sign.
4. Check tire condition.
5. Check structural members.
6. Check seat belts and operator cab safety equipment.
7. Check oil, fuel, and coolant levels per manufacturer recommendations.
8. Check instrument panel.
9. Check fire extinguisher and first aid kit.
10. Lubricate the equipment per manufacturer recommendation.

11. Check reverse alarm signal.
12. Check brake operation, both parking and service.
13. Check cleanliness.
14. Check overall security after operations.

APPENDIX C

REPAIR PARTS

1. PURPOSE. To describe typical repair parts stockage policy IAW CELD-ZA Memorandum, Dated 27 July 1998, Subject: Management of Material and Repair Parts.
2. GENERAL. The only repair parts that should be stocked are big ticket, high dollar value items that cannot be obtained in time to prevent mission failure and items that may be beneficial to stock based on cost and mission effectiveness. Items that can be purchased from local vendors, in a timely manner, should not be stocked. Exception to this would be isolated sites that would have problems in obtaining the parts from local vendors.
3. PROCEDURES. All repair parts must be accounted for from the time of purchase to when they are used. To accomplish this accountability the following applies:
 - a. All items must be on a stockage list approved by the Commander.
 - b. All items must be on an integrated financial and physical inventory (CEFMS). In other words, the inventory should track cost of the item and physical location to include totals on hand and on order to include a reorder point.
 - c. An accountable Officer/Person will be assigned to ensure compliance of the stockage of the repair parts criteria.
4. SECURITY. Security will be IAW Appendix D of this plan. All repair parts will be secured and protected at all times to prevent theft or destruction/deterioration, which could preclude mission accomplishment. Proper storage is of the utmost importance to protect items from weather and other elements.

APPENDIX D

SECURITY

1. PURPOSE. To ensure all personal property is secure at all times.
2. GENERAL. All equipment, when not in use or under personal control must be properly secured at all times to prevent theft or destruction which could preclude mission accomplishment. At a minimum the following rules will be followed:
 - a. All equipment will be inspected upon completion of each operation or maintenance service to ensure it is turned off and properly secured.
 - b. All keys and credit cards will be secured in a key cabinet or other approved secure storage device.
 - c. All equipment will be parked in a safe and secure area, commercial storage, garage or government facility. Never store equipment or park vehicles at a private and/or employee residence.
 - d. Supervisors will ensure all tools, repair parts, equipment, and protective clothing are properly secured at close of business.

APPENDIX E

SAFETY

1. PURPOSE. To ensure a safe operating and working environment in the Memphis District.
2. GENERAL. All employees play a critical role in achieving a safe working environment and ensuring all equipment is in a safe operating condition. Supervisors, Maintenance Managers and Maintenance Coordinators will:
 - a. Ensure all assigned operators are trained in the safe operation and preventive maintenance procedures for the equipment to be utilized.
 - b. Ensure all assigned equipment meets established safety standards.
 - c. Restrict use of equipment with questionable reliability or safety performance levels.
3. RESPONSIBILITIES. Operators will complete EMCS and safety checks before, during and after operation of all equipment. Discovered deficiencies that will affect the safe operation of the equipment will be corrected before continuing operations.
4. SAFETY RULES. Personnel working with or operating equipment or visiting shop/maintenance facilities will follow all of the safety rules outlined in AR 385-55 (Prevention of Motor Vehicle Accidents) and EM 385-1-1 (Safety and Health Requirements Manual). All personnel will adhere to the following minimum requirements:
 - a. No smoking in shop areas or when operating or riding in Government equipment.
 - b. Proper storage of flammable materials.
 - c. Keep work areas clean, well lit and ventilated.
 - d. Always drive slowly in work areas.
 - e. Ensure electrical equipment is properly grounded.
 - f. Supervisors will ensure all employees receive training in the proper use of fire fighting equipment.
 - g. Use eye, hearing, respiratory and other protective devices as required.
 - h. Inspect all tools and equipment before use.
 - i. Always use approved cleaning compounds.
 - j. No horseplay at any time.
 - k. Remove all jewelry and loose fitting clothing before inspecting or working on or around machinery or equipment.

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5. The above list is not all-inclusive. Use good common sense and protect yourself and others from injury. Direct all questions to supervisory personnel.

APPENDIX F

MAINTENANCE RESPONSIBILITY STRUCTURE

<u>TITLE</u>	<u>FUNCTION/TASKS</u>	<u>METHOD OF ACCOMPLISHMENT</u>
Maint. Officer	<ul style="list-style-type: none"> >Monitors Programs >Assures standards are met >Develops local policies >Assists supervisors in implementing programs >Performs annual written evaluations of programs >Prepares FOA maintenance plans (assembles) 	ER 750-1-1
Maint. Manager	<ul style="list-style-type: none"> >Identifies maintenance requirements >Prepares activity Maint. plan (equipment specific) >Determines resources >Monitors equipment performance >Evaluates maintenance programs 	ER 750-1-1
Maint. Coordinator	<ul style="list-style-type: none"> >Responsible for maint. >Performs dispatching >EMCS (determines operational or not) >Assures scheduled & unscheduled maintenance is performed >Processes upward reporting as required >Processes warranty requirements >Maintains operators records 	ER 750-1-1
Operator	<ul style="list-style-type: none"> >Performs and reports EMCS >Performs operator Maint. >Maintains utilization records >Reports operating irregularities to Maint. Coordinator for action >Reports parts used >Is responsible for safe operation of equipment 	ER 750-1-1

APPENDIX G

MAINTENANCE PLAN OUTLINE

1. PURPOSE. To define the purpose of developing a local Maintenance Plan.
2. GENERAL. All Division/Offices/Activities that have equipment that is identified under this plan must ensure they have a maintenance plan, which establishes the maintenance procedures for all areas of responsibility. This plan should include the sub-plans from Project/Field Offices/Branches. A copy of the Organizational Maintenance Plan will be submitted to the District Maintenance Officer, CEMVM-LO-S, and consolidated in the District Maintenance Plan.
3. PROCEDURES. The Organizational Maintenance Plan should address any areas that will be accomplished different from the District Maintenance Plan. This plan does not need to be a long and drawn out document. Don't submit plans that are duplicates of the District Maintenance Plan. Plans written from general guidelines or published in other publications (i.e., O&M Manuals) must reference the publication, chapter and paragraph. Do not reinvent the wheel.
4. SUGGESTED OUTLINE. A basic outline of the Maintenance Plan is as follows (only use the items that apply):

Subject: Maintenance Plan For _____.

1. Purpose
2. Applicability
3. References
4. Explanation of Abbreviations and Terms
5. Responsibilities
6. General Program Objectives
7. Maintenance Control Forms/System (i.e., Automated System for tracking maintenance requirements IAW ER 750-1-1 and EP 750-1-1)
8. Inspection Procedures
9. Contract Maintenance Procedures/COR
10. Warranty Control Procedures/WCO)
11. Oil Analysis Program (OAP)
12. Test, Measurement, and Diagnostic Equipment (TMDE) Calibration Procedures
13. Quality Assurance/Quality Control (QA/QC) Procedures

(Any Appendixes as needed)

Signed by the Chief/Vessel Master/Supervisor, etc.

APPENDIX H

SAFETY INSPECTION AND TESTING OF LIFTING DEVICES

1. PURPOSE: This Appendix prescribes procedures and guidance for accomplishment of safety inspections and testing of lifting devices. (Note: When manufacturer's recommendations or other guidance require more frequent inspection or load testing, use the more stringent standards.)

2. GENERAL: Any device or component used to raise, lower, hold, or position a load from one location or elevation to another must be inspected/tested for safety in accordance with Technical Bulletin (TB) 43-0142, Safety Inspection and Testing of Lifting Devices. Examples of lifting devices include Forklift Trucks, Cranes, Manual or Motorized Pallet Jacks, Hoist, Wreckers, A-Frames, Slings, Ropes, Wire Ropes, Hooks, O-Rings, Pear Rings, Spreader Bars or Lifting Clamps, Beams, Jacks, Safety Stands and Jack Stands.

a. On-vehicle equipment (jacks, winches, etc.) are not required to be tested/inspected.

b. Upon successful completion of the load test/inspection, the lifting device will be assigned the proper load rating (see TB 43-0142, Para 4a.(1)). The load rating shall be clearly marked on the device. In addition, the load rating shall become a part of the maintenance records of the equipment.

c. Upon completion of each inspection, all lifting devices will be marked as outlined below:

(1) The load rating and date of the next periodic inspection shall be stenciled on crane booms and other basic units. The stencil shall be of sufficient size and be located so it will be clearly visible from the ground and the operator's position.

(2) Hoists, chains, slings and hooks shall be marked to indicate the item identification number, load rating and next periodic inspection date. This marking may be accomplished by means of color coding, pressure sensitive tapes, metal tags, or a combination of these methods. (Note: Hooks shall not be painted, the paint could cover up small cracks.)

(3) A-Frames, Shop floor cranes, hoist beams, jack stands and jacks shall be stenciled with the load rating and date of the next periodic inspection.

(4) Forklifts shall be stenciled on the side of the mast to the operator's left with the load rating and the date of the next periodic inspection. Stenciled letters will be one (1) inch or larger in size.

3. Inspection:

a. Lift devices shall be visually inspected according to the criteria specified below under both daily and periodic inspection criteria before, during, and after load testing.

b. All lifting devices shall be inspected in accordance with the applicable Appendix in TB 43-0142 and the following minimum criteria:

(1) Daily inspection of lifting devices shall be performed by the operator before use. Also, prior to use of lifting devices which have been idle for one (1) month or more, but less than six (6) months, will be given an inspection in accordance with daily inspection criteria, plus a complete, documented inspection of the wire rope (if applicable), in accordance with TB 43-0142, Appendix C, Para C-1.a. Daily

inspections will comply with the criteria specified in the appropriate manufacture's manual for the device or the appropriate Appendix in TB 43-0142.

(2) Periodic inspection shall be conducted by maintenance personnel, assisted by the equipment operator, at least every twelve (12) months and prior to initial use of, all new, extensively repaired or altered lifting devices or lifting devices which have been idle for six (6) months or more. Periodic inspection criteria in the applicable Appendix of TB 43-0142 and the manufacturer's manual shall be used to determine serviceability of the equipment.

(3) Periodic inspection of lifting devices for handling hazardous materials shall include a function test. This requirement shall also apply to all lifting devices that incorporate hydraulic cylinders as a component of the load handling mechanism. Refer to TB 43-0142, Appendix A, Para A-4 for general description of a function test.

(4) Testing personnel shall repeat the periodic inspection procedures before handling any load heavier than that lifted in the last functional test. The heaviest load shall never exceed the load rating of the lifting device.

(5) The inspection and test results shall become part of the maintenance (history) records of the lifting device.

c. Annual load test of fixed hoist and cranes is mandatory for maritime application, if required by the manufacturer, or EM 385-1-1.

4. Performance Load Test (EM 385-1-1).

a. Under the following circumstances cranes shall be load tested by a qualified person:

(1) Prior to initial use of cranes in which load-sustaining parts have been altered, replaced, or repaired (excluding replacement of the rope).

(2) Every time it is reconfigured or reassembled after disassembly, and

(3) Every four (4) years.

b. Performance load test shall be conducted in accordance with manufacturer's recommendation. Test loads shall not exceed 100% of the manufacturer's load rating capacity chart at the configuration of the test.

c. Written reports of the rated load test, showing test procedures and confirming the adequacy of the repairs or alterations, shall be maintained with the crane or derrick or at the on-site project office.

APPENDIX I

OIL ANALYSIS PROGRAM (OAP)

1. PURPOSE: To provide personnel involved in the Army Oil Analysis program (AOAP) and Oil Analysis Program (OAP) with an understanding of the program and what is required to ensure oil sampling from applicable equipment is successfully accomplished. Discussed in this Appendix are the people, paperwork and processing procedures that make AOAP/OAP an indispensable tool for the Maintenance Team.

2. GENERAL: AOAP/OAP is a DOD-wide effort to detect impending equipment failures and to determine lubricant condition through periodic analytical evaluation of oil samples. It is a **Preventive/Predictive Maintenance Tool** for all selected equipment in our inventory. Like other maintenance tools, it must be used properly to be effective. This is a **Money** and **Resource** saving program, if used properly.

a. All equipment listed in Chapter 4, reference d, must be sampled in accordance with the intervals listed. Construction equipment, support equipment, watercraft, and material handling equipment, not listed in Chapter 4, reference d, with diesel engines having an oil capacity of five (5) gallons or more, associated automatic transmission, and hydraulic systems having a capacity of five (5) gallons or more, excluding brake systems, must be sampled.

b. Sampling is mandated by the number of hours the equipment has operated or by the number of days since the last sample was taken, according to which accrues first. For sample intervals, refer to EP 750-1-1, Appendix E.

c. It does not take long to sample the oil from your equipment. Sampling will save hours of maintenance downtime through early detection by the OAP laboratory of such problems as faulty air-induction systems, leaking cooling systems, loose cross-over fuel lines, and abnormal wear rates of moving metal parts. The sampling also gives the laboratory technician information about the quality of the lubricant or hydraulic fluid, which translates to savings through laboratory recommended oil changes on-condition (OCOC) as mandated by reference a. The benefits are:

(1) A sample, properly taken and sent to the oil laboratory for analysis, provides important information about equipment condition and maintenance quality. That is an investment in equipment maintenance and takes the cooperation of all concerned to make it beneficial to the government.

(2) Close contact between the OAP laboratory and maintenance personnel on OAP identified equipment problems will improve our maintenance program. Equipment reliability is improved through OAP. Design changes and product improvements have been proposed on the basis of oil analysis findings.

(3) By detecting signs of impending failures at an early stage, maintenance can be performed at a lower cost and can be planned instead of emergency maintenance that is more costly in timing and money.

(4) In the short run, this decreases maintenance cost. In the long run, it improves equipment reliability by reducing the number of catastrophic failures.

d. Savings are realized in oil and oil filter expenses including the cost of disposal of used oil, filters and hydraulic fluids. Oil changes are to be accomplished on-condition or laboratory recommendation only. On-condition means the laboratory tells us when oil has lost properties of a good lubricant and should be changed. In most cases the oil's useful life is extended.

e. While equipment is under manufacturer's warranty, we must follow the manufacturer's recommendation for oil and filter changes. If the laboratory recommends more frequent changes, that is acceptable; however, we should not make changes less frequently than required by warranty.

f. Seasonal and special oil changes must still be made if required by the manufacturer.

g. To sample other equipment that is not included under AOAP/OAP or if you feel the oil in your equipment is contaminated and you need to change it, contact the District Maintenance Officer (DMO) for guidance.

3. Responsibilities:

a. DMO has been appointed as the AOAP/OAP monitor for the District and will evaluate and monitor the program.

b. Maintenance Managers are responsible for:

(1) Ensuring the AOAP/OAP is operable in your respective organization, if applicable.

(2) AOAP/OAP (oil sampling) training is performed as required.

(3) Oil sampling supplies are adequate and available at the workstations.

(4) Samples are taken as scheduled for applicable equipment assigned to the workstation.

(5) Ensure Maintenance Coordinator or designated individual forwards samples with a properly prepared and posted DD Form 2026. (Samples will be forwarded by First Class/Priority Mail).

(6) Prompt and proper action is taken when abnormal reports are received.

(7) Ensure assigned maintenance personnel review and comply with all AOAP/OAP publications. When maintenance is performed on components at the recommendation of the AOAP laboratory, enter the deficiencies found and actions taken on the DA Form 3254-R (Form sent by the laboratory when there is a problem). The Form must be sent to the laboratory within five (5) days of the work completion.

(8) Ensure maintenance personnel assigned to sample oil know how to sample properly. Check all entries made on the DD Form 2026 are correct and complete. Check the sample bottles to ensure proper information is entered to identify it with a DD Form 2026.

c. Maintenance Coordinators or the designated employee(s) are responsible for:

(1) Collecting the oil sample. (It is your job to sample the equipment in accordance with the prescribed intervals. Always collect a reliable sample that is free from outside contamination. Note: Ensure you observe all safety precautions when obtaining a sample.)

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(2) Complete DD Form 2026 for each component sampled and ensure proper information is on the bottle.

(3) Send all samples to the laboratory the same day they are collected.

4. Laboratory Requested Samples: If the laboratory detects a problem, it may schedule samples at a shorter interval than normal to monitor it. If the laboratory requests a resample, get it back without delay. Mark the resample clearly to indicate that your sample is special by:

- a. Banding the bottle with red tape.
- b. Marking the borders of the DD Form 2026 in red.
- c. Writing "Special" in the remarks block of the DD Form 2026.

5. Once the sample has been taken and the bottle sealed, the DD Form 2026 (Oil Analysis Request) must be properly completed. This is imperative otherwise processing will be delayed. To complete the DD Form 2026, complete all blocks as indicated below: (See attached sample Form) (DMO has electronic version on disk)

To:	Ft. Campbell, KY
Major Command:	USACE
Operating Activity:	Memphis District 2915 Riverport Rd. Bldg. #8 Attn: CEMVM-LO-S Memphis, TN 38109 W38XGR (901) 785-8948
Equipment Model:	Name and model of component being sampled. (For example: Engine, DDC12V71 Port)
Equipment Serial Number:	Serial number of the component being sampled
End Item Model/Hull #:	The model or hull number of which the component above is a part of (For example, forklift, H60XL, or M/V Mississippi)
End Item Serial Number:	The serial number of the Main item listed above. (Note: if no serial number is available, use the barcode.)
Date Sample Taken:	Self-explanatory
Local time sample taken:	Leave blank
Hours/miles since Overhaul:	Cumulative number of

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	hours/miles on the component since new or last overhaul, if known.
Hours/miles since last oil change:	Number of hours/miles since last oil change on the component. State if miles (MI) or hours (HR).
Reason for sample:	Check applicable block. When reason is <u>other</u> explain under <u>remarks</u> . For example, <u>loss of engine power</u> , etc.
Oil added since last sample:	Self-explanatory
Action taken:	leave blank
Discrepant Item:	leave blank
How malfunctioned:	leave blank
How found:	leave blank
How Taken:	Self-explanatory
Sample Temperature:	Self-explanatory
Type Oil:	Self-explanatory
Engine Position:	Self-explanatory
Name:	Enter the name of the individual who obtained the sample.
Emp. No:	Enter the Office Symbol of the individual who obtained the sample.
Remarks:	Record Total usage data from the end item odometer or hour meter if one is installed. (Usage total number is the miles, hours, or kilometers the end item has accumulated in its life.) Note: If miles (MI), kilometers (KM) or

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hours (HR).

Phone:

Phone of the individual who
obtained the sample.

Signature:

OIL ANALYSIS REQUEST						
Individual's, who obtained the						
TO	OIL ANALYSIS LABORATORY Sample signature Ft. Campbell, KY					
	MAJOR COMMAND USCAE					
	OPERATING ACTIVITY (Include ZIP Code/APO/UIC) Memphis District, 2915 Riverport Rd. Bldg. #8, Attn: CEMVM-LO-S, Memphis, TN 38109, W38XGR (901) 785-8948					
EQUIPMENT MODEL Engine, DDC12V71 (port)						
EQUIPMENT SERIAL NUMBER 1A2B3C4D5e						
END ITEM MODEL/HULL NUMBER M/V Mississippi						
END ITEM SERIAL NUMBER 1234567						
DATE SAMPLE TAKEN (Day, Mo., Yr) 20-09-99				LOCAL TIME SAMPLE TAKEN		
HOURS/MILES SINCE OVERHAUL 2034Hr						
HOURS/MILES SINCE OIL CHANGE 527Hr						
REASON FOR SAMPLE <input checked="" type="checkbox"/> ROUTINE <input type="checkbox"/> LAB REQUEST <input type="checkbox"/> TEST CELL <input type="checkbox"/> OTHER (Specify)						
OIL ADDED SINCE LAST SAMPLE (Oz, Pts, Qts, Gals) 5 Gals						
ACTION TAKEN						
DISCREPANT ITEM						
HOW MALFUNCTIONED						
HOW FOUND <input type="checkbox"/> LAB REQUEST <input type="checkbox"/> AIR OR GROUND CREW						
HOW TAKEN <input checked="" type="checkbox"/> DRAIN <input type="checkbox"/> TUBE		SAMPLE TEMPERATURE <input checked="" type="checkbox"/> HOT <input type="checkbox"/> COLD		TYPE OIL 40W Rotella		
ENGINE POSITION: Main Port				REMARKS/MISC: Engine overheating 5048 Hr PHONE: (901) 785-8948		
NAME: Marion D. Taylor				SIGNATURE:		
EMP NO: CEMVM-LO-S						
FOR LABORATORY USE ONLY						
SAMPLE RESPONSE TIME						
FE	AG	AL	CR	CU	MG	NA
NI	PB	SI	SN	TI	B	MO
ZN	LAB RECOMMENDATION					
SAMPLE NUMBER(S)				FILE MAINT	DATA SEQ	

DD FORM 2026, MAR 1999 (EG)

PREVIOUS EDITION MAY BE USED.
WHS/DIOR, Mar 99

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6. Maintenance Coordinators or designated employees must ensure that the entries on the DD Form 2026 are correct (check for errors). He/she will add any special data needed to be forwarded to the laboratory in the remarks block. For example:

a. The details of any special maintenance on oil-wetted parts since the last sample or any symptoms that might indicate some problem.

b. Too much information is better than too little. If your sample is normal and no potential trouble is found, the laboratory informs you by returning the DD Form 2026 stamped Normal. If there is any discrepancy with your oil sample, the laboratory will call the DMO requesting another oil sample by telephone, followed by the DD Form 2026.

c. When an oil change or other maintenance is required, the DMO will be notified by telephone, followed by the DD Form 2026 indicating what actions are recommended. The filter is always serviced or changed when the oil is changed.

d. File and maintain the most recently processed DD Form 2026 for each component. Use this information as a baseline when preparing a DD Form 2026 for your next sample.

e. If you are using another laboratory other than the Army Laboratory, send a copy of the OAP report to the DMO.

7. When maintenance action is required, the District Maintenance Officer will notify you immediately by telephone. A DA Form 3254-R or computer printout will follow in the mail. The laboratory uses this report to record its findings and suggest what work may be necessary based on an analysis of the sample. Once corrective maintenance is completed, it is vital that the maintenance repair activity enters the discrepancy found and the repair action(s) taken in Block 14 (Feedback). DA Form 3254-R will be returned to the AOAP laboratory within five (5) days after the work is completed.

8. AOAP Data Bank: The above feedback is stored at a control database for use by the major command, the AOAP laboratory and the AOAP manager. Typical uses of these data are to:

a. Isolate patterns of equipment problems.

b. Ensure enrollment of equipment.

c. Monitor participation in the AOAP.

d. Evaluate laboratory performance.

e. Update evaluation criteria.

f. Determine need for additional laboratories.

g. Complete cost avoidance.

9. Oil Sampling Supplies: To ensure compliance with AOAP requirements, keep adequate stocks of sampling supplies on hand. The list below gives basic information about supplies needed. These items can be ordered from GSA/DLA. Any problems in ordering them should be brought to the attention of the DMO. If your equipment has a sampling valve installed, you do not need the oil sampling pump or tubing.

NOUN	NSN	UOI
Sampling Bottles	8125-01-082-9697	Box
Oil Sampling Pump	4930-01 119-4030	Ea
Tubing, Non-metallic ¼ in. outside diameter	4720-00-964-1433	Roll
Shipping Sack	8105-00-290-0340	Ea.
Plastic Bag	8105-00-837-7754	Bunch
Sampling Valve for Engines	4820-00-845-1096	Ea

(Recommend a 30-day supply of expendable supplies be stocked)

10. Tips on taking Oil Samples: The key to an effective AOAP is good sampling, that means getting the oil out in a way that ensures it is representative of the oil in the system. It also means getting the sample on its way to the OAP laboratory on the same day you take the sample. A sample can be collected without warming the equipment to operating temperature if it has been operated within the last thirty (30) days. Otherwise, warm the equipment before collecting the sample. (Note: We recommend always warming the equipment to operating temperature before collecting a sample unless the equipment is inoperable.)

a. Valve Method: To make sampling easier sampling valves are installed on many items of equipment. To collect a sample with a valve starting the engine to pressurize the system may be required, when the oil starts to flow, flush a small amount of oil from the line to clear out contamination. (Note: Always clean around the valve before taking a sample to avoid contamination from outside dirt, etc. Dispose of the drained oil properly.) Fill the sample bottle to the bottom of the neck or ½ in. from the top with oil from the sampling valve.

b. Pump Method. Sampling from equipment that has no sampling valve takes a little more time.

(1) Cut the tubing about ten (10) inches longer than the dipstick. Loosen the knob on top of pump. Insert the plastic tubing about two (2) inches into the pump. Tighten the knob just enough to grip the tubing firmly. Remove the cap from the sampling bottle, screw the sampling bottle on to the sampling pump.

(2) Remove the filler cap or the dipstick from the oil reservoir. Insert the tubing into the reservoir, **but be careful not to let the tubing touch the bottom of the reservoir.** If the tubing touched the bottom of the reservoir, sludge will be picked up and the laboratory will request another sample.

(3) Pull the pump handle out slowly several times while keeping the pump and bottle level. Oil should flow into the sample bottle. Fill the sample bottle to the bottom of the neck or about 1/2-inch from the top of the bottle. Push the vacuum release button when you have enough oil. Do not let oil get into the pump. If oil does get into the pump, clean it thoroughly before using it again.

(4) Remove the tubing from the dipstick opening. Unscrew the sampling bottle and replace the cap. Use a clean rag or tissue to wipe off any oil on the tip of the tubing. Then pull the tubing out of the pump head. Discard the tubing as oil contaminated material.

c. Whether collecting a sample by valve or pump, enter "end-item noun" and "component noun" and "serial numbers" on the sampling bottle. Complete the DD Form 2026. Immediately (one workday) send the oil sample to the Maintenance Coordinator for mailing.

11. Mailing Oil Samples.

a. When four (4) or less bottles are mailed use "shipping sacks". Insert the sample bottle into a plastic bag and seal. Place the completed DD Form 2026 and the plastic bag containing the sample bottle into the shipping sack. Staple or tape the shipping sack closed. Place address label on the sack. Send the sample by First Class/Priority mail to the AOAP laboratory. (See para 11.c. for mailing address) Do not use bulk mail or parcel post.

b. When five (5) or more bottles are mailed, use the box that the sample bottles came in. Ensure all caps are sealed tight on the sample bottles, place them in the box, put the DD Forms 2026's in a plastic bag, place them in the box and tape it shut. Put the mailing label on the box and mail it First Class/Priority Mail to the AOAP laboratory.

c. The mailing address for our supporting laboratory is:

Petroleum Lab.
Attn: AFZB RB AD BLDG #7137
RBC Aviation Div.
Ft. Campbell, KY 42223-5128

APPENDIX J

TEST, MEASUREMENT, AND DIAGNOSTIC EQUIPMENT (TMDE)

1. PURPOSE. To outline the policy and procedures for Test, Measurement, and Diagnostic Equipment repair and calibration.

2. GENERAL.

a. The U. S. Army TMDE Activity (USATA) is responsible for the management of the Army TMDE Program and for providing calibration and repair support for "ALL" Army TMDE. Several categories of CEMVM owned or leased equipment requires mandated testing or calibration, even though we do not have Army Standard Equipment. Support for the U. S. Army Corps of Engineers Activities are on a "NONREIMBURSABLE" BASIS (NO COST).

b. TMDE is of little value if it's not used and calibrated. TMDE is any system or device capable of being used to evaluate the operational condition of equipment or items. It identifies or isolates actual or potential malfunctions. The accuracy of TMDE will have an effect on the quality of work.

c. We must ensure all test, measurement, and diagnostic equipment is accurate. The only way to ensure the test, measurement and diagnostic equipment is accurate is to calibrate it at the proper intervals.

3. EQUIPMENT REQUIRING CALIBRATION.

a. Some equipment that requires calibration and repair support are:

Radiac Meters	Volt-Ohm-Ammeters	Radiological Survey Meters
Torque Wrenches	Dial Indicators	Densitometers
Dimensional Gages	Galvanometers	Velocity Meters
Micrometers	Current Meters	Signal Generators
Differential Pressure Gages	Frequency Converters	Chloridometers
Velocity Transducers	Multi Meters	Function Meters
Power Standard Assemblies	Range Finders	Dynamometers
Combustible Gas Testers	Thermistors	Thickness Gauges
Sound Level Meters	Anemometers	Acoustical Calibrators
Deadweight Testers	Ohmmeters	Dosimeters

b. The above list is not all-inclusive. To check if your equipment needs calibration, review TB 43-180 or call the TMDE Monitor (The DMO has been appointed as the TMDE Monitor, (901) 785-8948.

c. If the equipment does not require calibration, it may require a CNR (Calibration Not Required) label to be placed on it. Basically if the equipment looks like it may require calibration, but does not, then a CNR label should be attached. The label must be signed by the TMDE Monitor and the equipment added to the TMDE listing.

4. PROCEDURES FOR SCHEDULING TMDE FOR CALIBRATION.

a. Contact the TMDE Monitor (DMO) for instructions on getting the equipment to the Laboratory for calibration and repair. The TMDE Monitor will schedule dates for turn-in.

b. All equipment to be turned in for Calibration must have a completed DD 1149 for property control. Some equipment (limited by size, weight, dimensions) may be sent by registered mail, overnight delivery service, or hand carried. Ensure the equipment is properly packed to prevent damage. DD Form 1149, (Requisition and Invoice/Shipping Document) must be completed for each piece of equipment. Do not list more than one piece of equipment on DD Form 1149 (one item one form). Some equipment maybe to sensitive to move which requires it to be calibrated in place.

c. To use a commercial company in lieu of the Army TMDE Laboratory a request for exception to policy must be sent to the TMDE Monitor. Send the request for services and the justification to use the commercial services to CEMVM-LO-S Attn: TMDE Monitor/ DMO for approval. Some equipment must be tested by commercial companies because of the weight, size, shipping restrictions, cost advantageous, or the capability of the TMDE laboratory. **This type of equipment will require one time waiver only.** The TMDE Monitor will need a copy of the calibration paperwork for the records.

d. Send equipment by registered mail, return receipt requested to:

e. Send a copy of the DD Forms 1149 and registered mail receipts to the TMDE Monitor/DMO at CEMVM-LO-S.

5. MAILING INSTRUCTIONS.

a. Ensure each item has a DD Form 1149.

b. Ensure equipment is packed to protect it from damage.

6. POC is District TMDE Monitor/DMO, CEMVM-LO-S call (901) 785-8948 for TMDE assistance or instruction.

APPENDIX K

EQUIPMENT MANAGEMENT

1. Purpose. The objective of equipment management is to provide maintenance managers at all levels the data to make wise and informed management decisions. Our goal is to acquire, maintain, and manage equipment in a way that maximizes our ability to complete our missions effectively, at the lowest cost of ownership.

2. Equipment in the following groups will be tracked.

- a. Construction equipment
- b. Special Purpose equipment
- c. Material Handling equipment
- d. Watercraft/Amphibious equipment
- e. Support equipment

3. The following equipment will be reported under the above general headings for CMR. However usage will be reported separately for each item listed:

Item No.	End Item Code (EIC)	Nomenclature	Federal Supply Class
-----------------	----------------------------	---------------------	-----------------------------

WATERCRAFT

LAD	Barge, deck cargo		1930
LAF	Barge, fuel/oil		1935
LAH	Barge, hopper		1935
LAM	Barge, mooring	1930	
LAP	Barge, pipeline, float/pontoon	1935	
LAR	Barge, revetment/mat sinking		1935
LAS	Barge, dump/scow		1935
LAQ	Barge, quarters/office		1935
LAW	Barge, work, shop/service		1935
LEO	Towboats (inland style)	1925	
LEU	Tugboats (model bow)	1925	
LFD	Vessel, debris collecting		1940
LFL	Vessel, launch/inspection/patrol	1940	
LFS	Vessel, survey		1940

LFU	Vessel, utility boats(under 20 Ft)	1940 DP 750-1-1 19 Nov 99
LG*	Outboard propelling unit	2010
LHB	Crane barge, bank grader	1935
LHC	Crane barge, crawler	1935
LHM	Crane barge, mobile	1935
LHS	Crane barge, stiff leg/derrick	1935
LIM	Floating crane, marine revolver	1935
LIP	Floating crane, pedestal mounted	1935

CONSTRUCTION EQUIPMENT :

EH3	Scraper, earth moving,	3805
EA5	Tractor, full tracked, engine driven, w/bulldozer	2410
EDW	Tractor, wheel industrial,	2420
EHA	Grader, road motorized	3805
EKY	Crane, wheel mounted,	3810
EKM	Crane, truck mounted	3810
EMK	Crane, crawler mounted	3810
ELB	Crane shovel, truck mounted	3810
EMA	Crane shovel, crawler mounted,	3810
EPB	Shovel, front crane, crawler mounted	3810
EN4	Backhoe crane-shovel,	3810
E2*	Excavator, multipurpose, crawler mounted	3805
E2Y	Excavator, multipurpose, truck mounted	3805
EF6	Loader, scoop type, full tracked, engine driven	3805
EFH	Loader, scoop type, wheel, engine driven	3805
EXB	Compactor, high speed, tamping self propelled	3895
ETM	Roller, towed	3895
EUK	Roller, towed vibrating, engine driven	3895
EUC	Roller, motorized, engine driven	3895
E36	Auger, earth, full tracked, engine driven	3820
EU4	Auger, earth, skid mounted, engine driven	3820
E3N	Auger, earth, truck mounted, engine driven	3820
E23	Ditching machine, engine driven, crawler/wheel mounted	3805
ETA	Ditching machine, engine driven wheel mounted ladder	3805
E9G	Hammer, pile driver, self-propelled	3815
E9C	Drill, pneumatic drifter, crawler mounted	3820
EX3	Distributor, water, tank type, engine driven, truck mtd	3825
EVY	Mixer, rotary tiller diesel driven self-propelled	3895

EVA	Sweeper, rotary, towed, engine driven	3825
	Extractor, piling	3815

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SUPPORT EQUIPMENT :

VC2	Generator set, engine driven	6115
FBA	Pneumatic tool and compressor outfit, trailer mounted	4310
FBC	Pneumatic tool and compressor outfit, truck mounted	4310
DWF	Compressor, unit, rotary air, trl mtd, engine driven	4310
DWJ	Compressor unit, rotary air , whl mtd, engine driven	4310
DWV	Compressor unit, rotary, gas, truck mounted	4310
ZC6	Pump, centrifugal, engine driven,	4320
ZHA	Pump, reciprocating, engine driven	4320
2AA	Welding Machine, Skid Mounted	3431
FRC	Snow removal, self propelled, engine driven	3825
ED2	Tractor, wheel agriculture, engine driven	2420
FDS	Platform lift, scissors type	
ED*	Tractor, mower, lawn	2420

MATERIAL HANDLING EQUIPMENT :

DC4	Crane truck, warehouse electric	3930
DC6	Crane truck, warehouse electric hydraulic	3930
DC*	Crane truck, warehouse, engine driven	3930
DA3	Truck, fork lift, electric	3930
DA4	Tractor, wheeled warehouse, electric,	3930
DMN	Tractor, wheeled warehouse, engine driven	3930
DNZ	Truck, fork lift, engine driven	3930
DN*	Truck, forklift, propane gas driven	3930

4. Equipment that may be exempted from usage reporting.

a. Installed equipment. Equipment such as generators and compressors, which are a part of a Real Property Facility are not reported.

b. Emergency equipment. Equipment required to be on-hand for emergency use only, will not be required to report usage. However you must report Availability/Operational Rates and maintenance cost. Activities are responsible to document equipment that should be exempted from usage reporting. A memorandum for record will be sent to the DMO and kept on file. A note should be made on the reports to indicate equipment that is exempt from usage reporting.

5. The following reports will be forwarded to the DMO by the 5th working day of each month after the end of the report period.

a. Usage Report (Quarterly)(Equipment other than Vehicles)

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b. Availability/Operational Rates (Quarterly)

c. Maintenance Cost (Quarterly)

d. Maintenance Backlog (Quarterly)

6. Usage Report. Usage can be recorded on ENG Form 3662. The procedure each activity will use to keep track of the usage will be included in their maintenance plan. The report can be a copy of the ENG Form 3662 or other means as long as it includes the following data:

a. Nomenclature

b. Type Equipment (Construction Equipment, Support Equipment, Watercraft, and Materiel Handling Equipment)

c. Barcode

d. Beginning and ending date, miles and/or hours.

e. Number of times/days used during the report period. The report period will be from the first of each quarter to the end of the quarter.

f. Days maintenance

7. Availability/Operational Rates.

a. The report will include the following:

(1) Reporting unit/activity

(2) On hand quantity for each area (Construction Equipment, Support Equipment, Watercraft, and Materiel Handling Equipment)

(3) Possible days

(4) Nonavailable days

(5) Days equipment was available

(6) Operational rate as a percentage

b. To complete the above:

(1) Beginning date will be the first day of the Quarter.

(2) Ending date will be the last day of the quarter.

(3) Possible days are the total number of days the equipment was on hand during the report period. This includes non-work days, weekends, and holidays.

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Example: Number of items on-hand X number of days in the report period = possible days.

(4) Non-available days is the number of days the equipment was not able to perform its intended mission. If the equipment is not available at the end of the normal workday, it is considered non-available for the entire day. If the equipment is repaired prior to the end of the normal workday, it is considered available for the entire day. This includes non-workdays, weekends and Holidays.

(5) Available days are the total possible days minus the non-available days. The available days plus the nonavailable days must be the same as the possible days.

(6) Operational rate is the percentage of available days based on the possible days. The formula for this is: total available days divided by the total possible days, multiplied by 100 equals the operational rate, expressed as a percentage.

Example: $\frac{\text{Available days}}{\text{Possible days}} \times 100 = \text{percentage}$

8. Maintenance Cost (Parts and Labor).

a. This is a desired way to focus on equipment management by using Life Cycle Costing Techniques as a maintenance indicator. The objective is to provide managers at all levels a historical record of maintenance cost associated with equipment usage which helps us perform life cycle equipment management functions in a cost effective and efficient manner. All equipment reaches a time in its service life when it becomes a liability, rather than an asset. When the cost to maintain an item reaches a pre-established level or when it has mission crippling inoperative patterns, it is time to replace it.

b. Activities may use ENG Form 5006 R, ENG Form 2409 or their own method as long as it has all required data and is described in their maintenance plan.

c. The following data is required to be tracked and reported:

(1) Activity

(2) Cost for each type of maintenance (Preventive, Predictive, Repair, Rebuild, and Modification) for each category of equipment (Construction Equipment, Support Equipment, Watercraft, and Materiel Handling Equipment)

(a) Parts

(b) Labor

(c) Total

9. Equipment Maintenance Backlog.

a. The Equipment Maintenance Backlog is another way to gauge the level of performance effectiveness and efficiency in a Maintenance Program by monitoring the scheduled or unscheduled maintenance actions that are incomplete at the end of the Quarter. As an example, we wish to focus on maintenance backlog in terms of hours of scheduled or unscheduled maintenance for the five categories listed below:

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<u>CATEGORY</u>	<u>MAINTENANCE HOURS PLANNED</u>	<u>MAINTENANCE HOURS INCOMPLETE</u>
Preventive Maintenance (PM)		
Predictive Maintenance (PdM)		
Repair Maintenance (RM)		
Rebuild Maintenance (RbM)		
Modification (MM)		
TOTAL		

b. The measurement would examine the ratio of maintenance hours that remain incomplete compared to maintenance hours planned.

FORMULA: $\frac{\text{MAINTENANCE HOURS INCOMPLETE}}{\text{MAINTENANCE HOURS PLANNED}} \times 100 = \text{Backlog Ratio}$

c. The established goal is 15 percent or less for maintenance backlog. CMR indicators are indicated as percentages of maintenance backlog. Green indicator color is the goal.

Green = 15 percent or less

Amber = 16 - 20 percent

Red = 21 percent or higher

d. Maintenance hours planned (initially) at the beginning of the Quarter is the summation of hours required to complete planned or scheduled work, plus the additional hours required during the Quarter for maintenance. Maintenance hours that remain incomplete will be determined at the end of the current quarter.

e. The following data must be tracked and reported:

(1) Maintenance Activity

(2) Planned maintenance hours for:

(a) Construction Equipment

(b) Support Equipment

(c) Watercraft

(d) Material Handling Equipment

(e) Total hours

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(3) Maintenance Hours Incomplete for:

(a) Construction Equipment

(b) Support Equipment

(c) Watercraft

(d) Material Handling Equipment

(e) Total hours

(4) Information that will be included for items (2) and (3) above are the following categories:

(a) Preventive Maintenance (PM)

(b) Predictive Maintenance (PdM)

(c) Repair Maintenance (RM)

(d) Rebuild Maintenance (RbM)

(e) Modification (MM)

(f) Totals

10. See attached Forms. For copies of the disk containing the MS Excel files of the Forms, call the DMO.

11. When request for maintenance, repair, or replacement of equipment is made, a part of the justification will include the usage of the equipment, the operational rate, and whether the cost is within the assigned MEL. If it exceeds the MEL, give justification. All requests should be sent through the DMO for review before repairs/replacement are performed.

USAGE REPORT

ACTIVITY _____

REPORT PERIOD _____

NOMENCLATURE	TYPE EQUIP	BAR CODE	START	END	TOTAL	DAYS USED	DAYS MAINT
			MI/HR	MI/HR	MI/HR		

**COMMAND MANAGEMENT REVIEW (CMR)
EQUIPMENT OPERATIONAL (AVAILABILITY) RATES**

ACTIVITY: _____

PHONE: _____

A
CONSTRUCTION
(ENGINEER)
EQUIPMENT

B
SUPPORT
EQUIPMENT

C
WATERCRAFT

D
MATERIEL
HANDLING
EQUIPMENT

1. ON HAND QUANTITY

2. POSSIBLE DAYS
(# OF DAYS IN QTR.)

3. NONAVAILABLE DAYS
(DAYS NOT IN SERVICE

4. AVAILABLE DAYS
(2 - 3 = 4)

5. OPERATIONAL RATE %

GOAL MET: YES ____ NO

IF NOT WHY: _____

SOURCE OF MAINTENANCE DATA: _____

REMARKS: _____

AUTOMATED SYSTEM: _____

HARD COPY MAINTENANCE RECORDS: _____

DATA PROVIDED BY: _____

DATE: _____

EQUIPMENT OPERATIONAL (AVAILABILITY) RATES

DIRECTIONS FOR COMPLETING THE FORM

The only blocks that need to be completed are:

1. Activity
2. Phone
3. Lines 1, 2, and 3 for Construction Equipment, Support Equipment, Watercraft, and Materiel Handling Equipment. Lines 4 and 5 plus Total will be calculated automatically by the MS Excel program.
4. Goal Met
5. If No Why
6. Source of Maintenance Data
7. Remarks
8. Automated System
9. Hardcopy Maintenance Records
10. Data Provided By
11. Date

For copy of the disk/form call the DMO.

**COMMAND MANAGEMENT REVIEW (CMR)
MATERIEL MAINTENANCE COST DATA (PARTS & LABOR)**

ACTIVITY: _____

PHONE: _____

PARTS COST

	CONSTRUCTION (ENGINEER) EQUIPMENT	SUPPORT EQUIPMENT	WATERCRAFT	MATERIEL HANDLING EQUIPMENT	TOTAL COST
1. PREVENTIVE MAINTENANCE					
2. PREDICTIVE MAINTENANCE					
3. REPAIR MAINTENANCE					
4. REBUILD MAINTENANCE					
5. MODIFICATIONS					
TOTAL COST:					=

LABOR COST

6. PREVENTIVE MAINTENANCE					
7. PREDICTIVE MAINTENANCE					
8. REPAIR MAINTENANCE					
9. REBUILD MAINTENANCE					
10. MODIFICATION					
TOTAL COSTS:					= OVERALL TOTAL

SOURCE OF MAINTENANCE DATA:

REMARKS:

AUTOMATED SYSTEM (NAME)

HARD COPY MAINTENANCE RECORDS:

CONTRACTOR INVOICE: YES ____ NO DATA PROVIDED BY:

DATE:

LINE 1 TOTAL COST + LINE 6 TOTAL COST / OVERALL TOTAL X

100 = _____%

LINE 2 TOTAL COST + LINE 7 TOTAL COST / OVERALL TOTAL X

100 = _____%

LINE 3 TOTAL COST + LINE 8 TOTAL COST / OVERALL TOTAL X
100 = _____%
LINE 4 TOTAL COST + LINE 9 TOTAL COST / OVERALL TOTAL X
100 = _____%
LINE 5 TOTAL COST + LINE 10 TOTAL COST / OVERALL TOTAL X
100 = _____%
TOTAL PARTS COST + TOTAL LABOR COST / OVERALL TOTAL X
100 = _____%

MATERIEL MAINTENANCE COST DATA (PARTS AND LABOR)

DIRECTIONS FOR COMPLETING THE FORM

The only blocks that need to be completed are:

1. Activity
2. Phone
3. Information for lines 1 -10 for Construction Equipment, Support Equipment, Watercraft, and Materiel Handling Equipment.
4. Source of Maintenance Data
5. Remarks
6. Automated System
7. Hardcopy Maintenance Records
8. Contractor Invoice
9. Data Provided By
10. Date

The MS Excel program automatically calculates all other data.

For copy of the disk/form call the DMO.

**COMMAND MANAGEMENT REVIEW (CMR)
EQUIPMENT MAINTENANCE BACKLOG**

ACTIVITY: _____

PHONE: _____

MAINTENANCE HOURS PLANNED

	CONSTRUCTION (ENGINEER) EQUIPMENT	SUPPORT EQUIPMENT	WATERCRAFT	MATERIEL HANDLING EQUIPMENT	TOTAL HOURS
1. PREVENTIVE MAINTENANCE					
2. PREDICTIVE MAINTENANCE					
3. REPAIR MAINTENANCE					
4. REBUILT MAINTENANCE					
5. MODIFICATIONS					
TOTAL HOURS:					=

MAINTENANCE HOURS INCOMPLETE

6. PREVENTIVE MAINTENANCE					
7. PREDICTIVE MAINTENANCE					
8. REPAIR MAINTENANCE					
9. REBUILT MAINTENANCE					
10. MODIFICATION					
TOTAL HOURS:					=

SOURCE OF MAINTENANCE HOURS DATA:

AUTOMATED SYSTEM (NAME)

HARD COPY MAINTENANCE RECORDS:

DATA PROVIDED BY:

REMARKS:

DATE: _____

LINE 6 TOTAL HOURS / LINE 1 TOTAL HOURS X 100 =
 _____%
LINE 7 TOTAL HOURS / LINE 2 TOTAL HOURS X 100 =
 _____%
LINE 8 TOTAL HOURS / LINE 3 TOTAL HOURS X 100 =
 _____%
LINE 9 TOTAL HOURS / LINE 4 TOTAL HOURS X 100 =
 _____%
LINE 10 TOTAL HOURS / LINE 5 TOTAL HOURS X 100
= _____%
TOTAL HOURS INCOMPLETE / TOTAL HOURS
PLANNED X 100 = _____%

EQUIPMENT MAINTENANCE BACKLOG

DIRECTIONS FOR COMPLETING THE FORM

The only blocks that need to be completed are:

1. Activity
2. Phone
3. Information for lines 1 - 10 for Construction Equipment, Support Equipment, Watercraft, and Materiel Handling Equipment.
4. Source of Maintenance Data
5. Remarks
6. Automated System
7. Hardcopy Maintenance Records
8. Data Provided By
9. Date

The MS Excel program automatically calculates all other data.

For a copy of the disk/form call the DMO.

APPENDIX L

Inspection and Test of Air and Other Gas Compressors

All air and other gas compressors and containers will be inspected/tested IAW EM 385-1-1 and TB 43-0151.